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Citation for published version:

Boukouras, A & Koufopoulos, K 2008 'Frictions to Political Competition and Financial Openness'.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Early version, also known as pre-print

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Frictions to Political Competition and Financial Openness*

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November 29, 2008

Abstract

In this paper we present a political economy approach in order to explain the degree of financial openness for an economy. In the model, entrepreneurs, who may have good or bad projects, vote for policies, which are proposed by selfish politicians. Two political frictions (ideological adherence and a supermajority requirement) impair political competition and lead to equilibria, where politicians receive corruption bribes. Furthermore, the model implies a non-monotonic relationship between financial openness and corruption and a positive relationship between financial openness and government size. Some of the model predictions are consistent with empirical findings while other predictions have not been tested yet.

Keywords: corruption, financial openness, ideology, politicians

JEL Classification: G21, G28, H32, P16, P43

*We would like to thank Theodoros Diasakos, Alex Stremme, Dezso Szalay, Spyros Vasilakis and especially Herakles Polemarchakis for their insightful discussions and comments. All remaining errors are ours.

1 Introduction

Theories of financial openness emphasize various economic reasons for explaining the international flows of capital. A commonly provided cause of openness is the need for risk diversification through the trading of financial assets between countries with different productivity shocks. Examples of this type of argument and its implications for growth are provided by various papers, such as Devereux and Smith (1994) and Obstfeld (1994). Other papers point out the benefits of openness that accrue through the specialization of countries when production technologies exhibit increasing returns to scale (Romer, 1987) or when countries are in different stages of their economic development (Barro, Mankiw and Sala-I-Martin, 1995).

However, whether a country opens its borders to foreign capital or not depends crucially on the incentives of the politicians who make the decision. Irrespectively of the potential benefits that such a decision may generate to the rest of the economy, if politicians' objective is to maximize their own utility, then it is not clear that financial openness will occur. Until recently, economic literature has ignored the political aspects of capital account liberalization, apart from some rare exceptions (for instance, see Alesina and Tabellini, 1989).

The purpose of this paper is to provide a political economy view of financial openness, by examining the incentives of politicians to open up capital markets under conditions which favor political rents. First, we introduce a symmetric political competition voting game in a closed economy, where voters exhibit a certain degree of ideological adherence to one of the two politicians (alternatively, politicians can be viewed as political parties) and each political contestant is required to achieve some form of super majority in order to win the election. Politicians in governmental positions can influence the decisions of financial institutions, such as banks, on how to allocate funds between good and bad projects. Good projects produce higher observable output than bad projects. If a part of the funds is provided to the latter form of investment, they extract some political rents (which we refer to as corruption bribes) ¹.

We assume that politicians are selfish, in the sense that they care only about being elected and the amount of bribes they receive. They make political proposals to voters regarding taxation, which will be used to cover the potential losses of financial institutions, and the distribution of funds between types of projects. Under these conditions,

¹For simplicity, in this paper we allow only entrepreneurs with bad projects to bribe politicians. Alternatively, we could allow both types of entrepreneurs to bribe politicians, but projects differ in terms of transparency. For transparent projects output is fully verifiable at zero cost, whereas for opaque projects only a part of output can be verified costlessly. This verifiable part of the output of opaque projects is not enough to cover the cost of investment. As a result, transparent projects can receive financing from private banks, whereas opaque projects cannot. Politicians channel the funds of state-owned banks to opaque projects, they tax transparent projects to cover the resulting losses and use the power of the state (institutions under their control) to extract part of the non-verifiable output (bribes to politicians). If the non-verifiable part of the output of opaque projects the politicians can extract exceeds the net present value of transparent projects then we can obtain the same qualitative results as in this paper. These results are available from the authors upon request.

we derive the equilibrium of the voting game and show the implications of political frictions for corruption.

Subsequently, we generalize the model to the case where politicians can also make offers on the degree of financial openness of the economy, so that good projects can receive foreign capital for investment. We derive the political equilibrium of the extended game and show how financial openness and corruption are causally related to political frictions. An important finding of our modeling approach is that the relationship between financial openness and corruption is not monotonic. More specifically, the sign of the correlation between corruption and financial openness depends on the degree of investor protection. If a country has well functioning institutions of investor protection, then financial openness is positively related to political frictions. If, on the other hand, a country has weak investor protection institutions, then openness and political frictions are negatively related. Therefore our model provides an explanation for why empirical studies can not find a robust relationship between financial openness and corruption.

From a theoretical standpoint, there are few papers directly related to our approach. Alesina and Tabellini (1989) were among the first researchers who tried to explain capital mobility through a political economy approach. Their model concerns an economy where there are two types of government, one favoring policies that increase the returns to labor and the other favoring policies that increase the return to capital. The two governments alternate in power, which generates political uncertainty and induces a partial flight of capital abroad. This is a useful approach to explain events of capital flight, however, their model can not be used for explaining foreign investment or its relation to corruption levels in the economy.

Inclan and Quinn (1997) also relate the policies that political parties employ to the interests of the socioeconomic groups that support them. They differentiate parties to left wing and right wing and assume that either type of party may favor capital account liberalization depending on the effects of such policies to the income of the groups that support them. For instance, in countries where skilled labor abounds they claim that left wing parties will generally favor financial liberalization. However, their theory treats political contestants as agents of specific social groups and it is not concerned with the reasons behind politicians decision to express the interests of one social group over another. In contrast, we place more emphasis on the economic conditions which align political incentives with the interests of particular social groups and their repercussions on the political decision of financial openness.

Another paper that adopts a political economy approach is Aizenman and Noy (2003). In their paper, a benevolent government tries to raise the necessary funds in order to finance a specific level of public good expenditure by either taxing income or by taxing agents' endowment of capital. Both methods of taxation are costly in their own ways. Income taxation implies collection costs while capital taxation induces capital flight and restrictions to financial openness. In turn, agents will try to bypass these restrictions by misvoicing of exporting goods and bribing customs officials. As a result, countries with very inefficient tax collection systems will generally exhibit low levels of

financial openness and high levels of corruption. Aizenman (2004) goes one step further by associating trade openness with financial openness and by claiming that as the degree of trade openness increases for an economy, exporting goods misvoicing becomes easier and financial restrictions less efficient for tax collection purposes. Therefore, financial openness should be positively correlated with trade openness. In contrast, in our model, financial openness implies capital inflows but not capital outflows. Capital markets are assumed to be competitive and so outside investors are making zero profits in equilibrium. As a result, the imposition of taxes has no effect on outside investors and does not give rise to capital flights ². Our notion of corruption is also different. While corruption in the Aizenman and Noy model reflects bribes to public servants, our model views corruption as the rents that politicians themselves receive from their political activities.

From an empirical point of view, our model is also related to a wide range of papers. There is an extensive literature which tries to assess the empirical relationship between financial openness and corruption, with ambiguous results. Studies by Wei (1999), Larrain and Tavares (2000), Drabek and Payne (2001), Edison, Levine, Ricci and Sløk (2002) and Dreher and Siemers (2005) report the existence of a negative correlation between corruption levels and financial openness. On the other hand, studies by Wheeler and Mody (1992), Alesina and Weder (1999) and Gatti (2004) do not find any statistical significant relationship between the two variables.

For example, Larrain and Tavares (2000) try to relate levels of trade and financial openness to corruption. They find a statistically significant negative relationship between trade and corruption, as they also do for foreign direct investment as a percentage of GDP. In a similar study, however, Gatti (2004) does not find any robust correlation between capital mobility and corruption, despite finding a negative correlation when examining the effects of trade. This is a characteristic case of the dichotomy of the literature on this issue.

Our model is capable of providing a framework that explains the inability of empirical literature to find a robust result. According to our model, financial openness and corruption are both indirectly related to political and institutional features of the economy. Therefore, whether corruption appears to be positively or negatively correlated with capital mobility depends on other variables as well (political frictions, degree of investor protection). Under our framework, both types of correlation are possible and this can explain why empirical studies disagree.

Our model is consistent with other empirical observations, as well. Mauro (1995) finds a statistically significant negative relationship between corruption and growth rates. In our voting game, higher ideological adherence gives higher ability to politicians to manipulate sources of finance toward bad projects and bribes for themselves.

²However, taxes affect entrepreneurs and so entrepreneurs have an incentive to move to countries with lower tax rates, provided that the relocation costs are zero. We assume that these relocation costs are sufficiently high so that moving to another country is not a profitable choice. This is particularly relevant for firms whose production is intensive in immobile factors of production. The formalization of this argument is available from the authors upon request.

Therefore, higher corruption may be associated with lower levels of observable output. If we were to extend our model to a multi-period setting, then lower output would have adverse effects to income growth, so that we would replicate Mauro's results.

Alfaro and Charlton (2007) explore the effects of international financial integration to countries' entrepreneurial activity and find a positive and statistically significant relationship between the two under various proxies for entrepreneurship. Furthermore, they find that the industries, which exhibit the greatest increase in their activities, are the ones which receive the greatest share of foreign capital. Our model is consistent with this observation, as it directly relates financial openness to the funding of domestic projects and the financial constraints of a closed economy.

Finally, our model has two predictions which have not been tested so far. First, the relationship between financial openness and government size which, according to our model, is positive. Second, the relationship between frictions to political competition and openness. Our model suggests that if a country has well functioning institutions of investor protection, then financial openness is positively related to political frictions. If, on the other hand, a country has weak investor protection institutions, then openness and political frictions are negatively related. Key political variables like electoral systems or political polarization may be required in studies which examine the impact of corruption to economic variables.

In section 2 we provide a simple symmetric model of a voting game between two political parties in a closed economy. We derive the Nash equilibrium of the game under political competition. Section 3 generalizes the model, by allowing political contestants to make offers on the degree of financial openness. We once more derive the Nash equilibrium in terms of the main variables and provide some comparative statics in order to clarify the causal relationship between political frictions and corruption, financial openness or government size. Section 4 makes some brief comments and concludes.

2 Political Competition in a Closed Economy

The economy is assumed to last for a single period and consists of two basic categories of agents. On one hand, there is a series of entrepreneurs, whose projects differ with respect to their productivity. At the same time these entrepreneurs vote for the politician they prefer to be in power and his respective policy. On the other hand, there is a group of politicians, who propose several political measures and compete to get elected and receive the power-related benefits. Entrepreneurs have different preferred policies, according to their productivity, and different degrees of ideological adherence to a certain politician or political party, which allows for inefficient policies to be implemented and a certain degree of corruption to pertain in the economy. The timing of the model is shown in Figure 1.

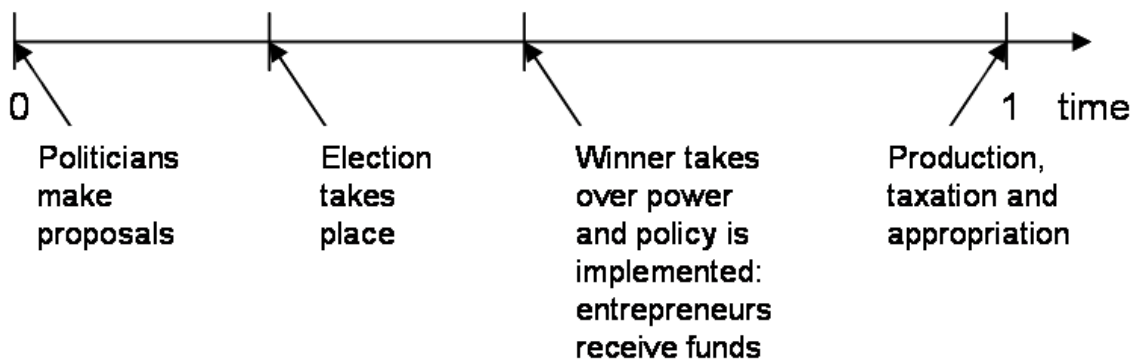


Figure 1: Timing of events

Entrepreneurs and Banks

There is a continuum of risk neutral entrepreneurs in the interval $[0,1]$, who are distinguished into types by the quality of the project they have. There exist 2 types of entrepreneurs, those with high quality (or good) projects (α_H), who amount for a fraction q of the total population, and those with low quality (bad) projects (α_L) and a fraction $(1-q)$. Each one of them requires an amount I of funds to start up his project, which will yield with certainty either $\alpha_H I$ or $\alpha_L I$ after 1 period, depending on the type of project. We assume that $\alpha_H > 1 > \alpha_L$. The quality of the project is publicly known and verifiable without any cost. Furthermore, by running the project the entrepreneur receives an unobserved, private benefit b , which has been deducted in the calculation of the net project-returns $\alpha_H I$ and $\alpha_L I$.

Let λ denote the fraction of projects that can be undertaken by the available funds ($0 < \lambda \leq q$). These funds are provided to the entrepreneurs through state-owned banks, which do not operate exclusively under economic criteria, but are also prone to pressures by the political party in power. Therefore the provision of funds for all good projects is not guaranteed, since politicians have an incentive to channel a part of the funds to low quality projects, from which they receive bribes (as long as $\lambda < q$).

If a bad project receives funds, after one period the entrepreneur will repay back to the bank an amount $r_L I$, which is determined by the politician, while the residual return from the project ($\beta = \alpha_L - r_L$) is repaid to the politician as a bribe. This means that if some bad projects receive funds, banks cannot recover the full amount of loans they provide to them and alternative means of financing are required through either taxation or higher repayment rates on good quality firms' profits. Since the politicians ultimately have the power to extract profits from high quality entrepreneurs through taxation, they allow public banks to compete with each other for high quality projects, which drives high quality projects' repayment equal to I , and use taxation as the sole means of rent extraction.

Politicians

There are 2 political players in this economy, P_1 and P_2 , who can be interpreted as major political parties or more accurately as key politicians. These 2 vie for the control of the government. At the beginning of the period each one of them makes a public proposal of his intended policies to the set of voters, who according to their preferences choose who will govern. Once in government the elected politician has the power to set taxation for firms and the ability to exert influence over the decisions of the public banks on how to distribute the available funds for investment. If a certain level of funds is provided to bad projects in exchange for political support, then taxation is needed to cover the losses of banks.

The extent to which a politician can manipulate internal funds depends on the restrictions on the mismanagement of state-owned banks and his ability to remain in power despite these events. The assumption we maintain throughout the rest of the paper is that the politician has full discretion on how to allocate the available funds to the two types of projects. This means that the politician can only take decisions that do not lead state-owned banks to bankruptcy and this is a constraint he cannot manipulate. In addition, politicians have the power to bargain with low quality entrepreneurs on how the returns from their projects will be allocated between repayment to banks (r_L) and direct transfers to politicians (corruption bribes: β).

On the other hand, another set of restrictions is implicitly imposed by political competition and the fact that a pure predatory behavior from the politician's part is unlikely to win him the election. More specifically, before the election takes place the two politicians publicly announce the set of politically controlled variables, namely the profit tax rate (t) and the number of good projects (s_H) that will be funded. We denote the political proposal by politician P_i as: $P_i^R = \{t_i, s_H^i\}$

An implicit element of the proposal is the level of funds the politician appropriates from each low quality entrepreneur ($\beta_i I$), which can be considered as a political bribe or a reward for the politician for allowing bad projects to operate. This is never part of the public announcement but, given the proposal and the information structure of the environment, agents are able to infer the amount of proposed corruption as well as the repayment rate for bad projects (r_L) and the amount of low quality entrepreneurs who will receive funds (s_L). The total level of corruption in the economy is the bribe received from each low quality entrepreneur times the number of low quality firms receiving funds: $B = \beta s_L I$.

In this framework we assume that political announcements are credible and that there are no commitment issues. Once in office, the politician implements his predetermined policy or otherwise he is thrown out of power and the other politician takes over ³.

³We could alternatively obtain the same qualitative results by setting up a dynamic model with reputation effects and politicians competing for power given their credibility. This would give a more rigorous argument on why policies may be considered credible, but it would make the analysis much more complex and mathematically demanding.

Entrepreneurs as Voters

Entrepreneurs vote for their preferred candidate based on the expected utility they will derive from his policies and their ideological adherence. Each politician represents a specific ideology (ideology i for P_i and ideology j for P_j , which are fixed for each politician), while voters have individual tastes which we assume that are uniformly distributed over the interval $[-M, M]$ within each group of types of entrepreneurs. M shows the degree of adherence to the ideology i , or, in other words, it is the relative likeness or antipathy that an agent has to ideology i over j . We let the variable d_k^i denote the relative preference of agent k ($k = \{h, l\}$) for ideology i . By definition the following equations hold:

$$d_h^i \sim Uni[-M, M]$$

$$d_l^i \sim Uni[-M, M]$$

$$d_k^i = -d_k^j$$

where the subscripts h and l denote an entrepreneur of a high or low quality project respectively.

The following figure shows the distribution of preferences for ideology i within each type of voters:

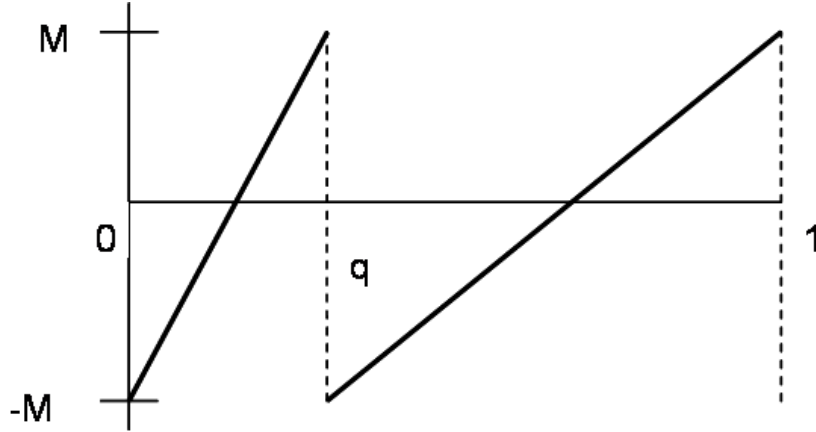


Figure 2: Ideological Distribution

We assume that the utility of a voter, conditional on his type, his ideological profile and the policy proposition of party i , is simply the sum of the utility of expected profit and of his ideological adherence:

$$U_k(P_i^R) = E(\pi(P_i^R)) + \frac{d_k^i}{2}$$

For each type of agent utility can be written as:

$$U_h(P_i^R) = \frac{s_H^i}{q} [(\alpha_H - 1 - t_i)I + b] + \frac{d_h^i}{2} \quad (1)$$

$$U_l(P_i^R) = \frac{s_L^i}{1-q}b + \frac{d_l^i}{2} \quad (2)$$

The first multiplicative term is the probability of an entrepreneur to undertake the project under the proposed policy and the second term is the income he would receive in that case. The last term corresponds to the utility gain attached to ideological voting.

From the above equations and the fact that $d_k^i = -d_k^j$ follows that an agent will vote for politician P_i (denoted as: $v_k^i = 1$) iff:

$$U_k(P_i^R) > U_k(P_j^R) \Leftrightarrow E(\pi_k(P_i^R)) - E(\pi_k(P_j^R)) + d_k^i > 0 \quad (3)$$

Elections and Politicians

Let V^i be the total votes that P_i receives. In order to win the election we assume that the politician must receive a critical mass of ϵ votes more than his competitor, where ϵ can be an interval arbitrarily small. If P_i receives less votes than P_j by a difference at least as large as ϵ then he loses the election, while if the difference is less than this threshold, he loses the election with only a probability equal to $\frac{1}{2}$. The election rule is then specified as:

$$p_{win}^i = 1, \text{ if } V^i - V^j \geq \epsilon$$

$$p_{win}^i = \frac{1}{2}, \text{ if } -\epsilon < V^i - V^j < \epsilon \text{ and}$$

$$p_{win}^i = 0, \text{ if } V^i - V^j \leq -\epsilon$$

The critical mass of voters ϵ is an important parameter of the problem at study. It reflects the necessary majority in the society for the formation of a politically stable government. Higher values of this parameter mean that politicians need a higher majority to secure election and distort their proposals toward more rent seeking policies.

Given the above specifications of the economy, politicians try to maximize their expected wealth, which consists of the appropriated part of the low projects returns:

$$\max U_p(P_i^R, P_j^R) = p_{win}^i B_i^\gamma$$

where γ is the coefficient of risk aversion for politicians ($0 \leq \gamma \leq 1$). Politicians essentially try to maximize the expected appropriation of funds under the limitations that they have been imposed to them:

–the allocation of funds condition:

$$(s_H^i + s_L^i) I \leq \lambda I \quad (4)$$

(the available funds for investment can either be invested in good projects or bad ones)

–the allocation of bad projects’ returns:

$$\beta_i + r_L^i \leq \alpha_L \quad (5)$$

–the profitability of public banks condition:

$$r_L s_L^i I + s_H^i I + t_i s_H^i I - B \geq \lambda I \quad (6)$$

(the sum of the repayments by bad and good projects and aggregate taxation must be at least equal to the initial funds available for investment)

–the Election Rule and the commitment of execution of proposed policies.

In terms of mathematical expressions, each candidate tries to solve the following problem (P.1):

$$\max_{s_H^i, s_L^i, t_i, \beta_i, r_L^i} U_p(P_i^R, P_j^R) = p_{win}^i B_i^\gamma \quad \text{s.t.}$$

$$B_i = \beta_i s_L^i I$$

$$(s_H^i + s_L^i) I \leq \lambda I$$

$$\beta_i + r_L^i \leq \alpha_L$$

$$r_L^i s_L^i I + s_H^i I + t_i s_H^i I \geq \lambda I$$

$$0 \leq t_i \leq \alpha_H - 1$$

$$p_{win}^i = 1, \text{ if } V^i - V^j \geq \epsilon, p_{win}^i = \frac{1}{2}, \text{ if } -\epsilon \leq V^i - V^j \leq \epsilon, p_{win}^i = 0, \text{ if } V^i - V^j \leq -\epsilon$$

Political Equilibrium

We now analyze the equilibrium of the political game described above. The power of politicians is not unchecked, but subject to the constraints imposed by political competition and the election rule. If a politician tries to maximize his own wellbeing, as a dictator would do, then he will be undercut by his competitor, who will offer a more attractive option to voters and will win the election.

But winning the election is costly itself. If the two politicians make exactly the same political proposal to voters then none of them would win with certainty. Since ideological dispersion is symmetric by assumption, half of the agents would vote for either politician. We call the set of voters who vote for one politician over another, when both of them offer the same proposal, as the natural support group, because of their exogenous ideological preference.

If a rival wants to win the election with certainty, a required mass of ϵ voters is required and these voters have already a certain degree of ideological adherence to

the other candidate. In order to win their votes a politician will have to offer greater concessions to them in terms of political proposal than what he would have offered to his own supporters and this cost is increasing in relative terms as the concessions required for election victory increase. Therefore there is a cut-off point, which makes politicians indifferent between winning elections or sticking to their support group and taking over power with probability $\frac{1}{2}$. Given the above intuition, the rest of this section is focused on providing a diagrammatic and analytical exposition of the solution of the political game and the main arguments behind the results.

First, we try to describe the set of political proposals for politician P_i , which win him the election for a specific proposal by P_j and then compare the utility from winning an election with the utility from playing the same strategy as the opponent and winning with probability $\frac{1}{2}$. Essentially, the political contestants have 2 different strategies. They can either try to win the election, which implies a relative benefit from the certainty of rising to power and a relative cost in terms of higher concessions to voters, or they can mimic their opponent in terms of proposal and wait for luck to determine who gets the power.

If a politician mimics his opponent, then he will receive $\frac{1-q}{2}$ votes from entrepreneurs with low quality projects and $\frac{q}{2}$ votes from entrepreneurs with high quality projects, for a total of $\frac{1}{2}$. If, on the other hand, P_i deviates, he requires at least $\frac{1+\epsilon}{2}$ votes to win the election ⁴. The amount of extra low quality voters he will receive from such a deviation

(which can also be negative) is: $\frac{(s_L^i - s_L^j)b}{M} \frac{1-q}{2}$.

$\frac{(s_L^i - s_L^j)b}{1-q}$ denotes the excess monetary utility low quality entrepreneurs will receive by P_i 's proposal and when divided by M it denotes the proportion of inefficient entrepreneurs for whom the differential monetary utility exceeds their ideological adherence. Of course, in order to be consistent, we assume that $-M \leq \frac{(s_L^i - s_L^j)b}{1-q} \leq M$ since the fraction of the two values can not exceed 1. $\frac{(1-q)}{2}$ is the amount of voters who can be attracted from or lost to the opponent. The total expression can be rewritten as $\frac{(s_L^i - s_L^j)b}{2M}$ and, by including the natural supporters, the total number of bad type voters is:

$$V_l^i(P_i^R, P_j^R) = \frac{(1-q)}{2} + \frac{(s_L^i - s_L^j)b}{2M}$$

Similarly the amount of extra high quality voters a politician can receive by $P_i^R \neq P_j^R$ is $\frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M}$, while the total number of good type voters is:

$$V_h^i(P_i^R, P_j^R) = \frac{q}{2} + \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M}$$

⁴Recall that if i receives an number of $\frac{\epsilon}{2}$ extra votes by changing his proposal, his opponent loses these votes, so that the total vote difference is equal to ϵ

All this implies that the total support politician P_i should expect is equal to:

$$V^i(P_i^R, P_j^R) = \frac{1}{2} + \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M}$$

If he were to win, then the following condition should be satisfied:

$$V^i(P_i^R, P_j^R) = \frac{1}{2} + \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} \geq \frac{1 + \epsilon}{2} \quad (7)$$

Essentially, if the politician were to win the election he should solve the modified problem P.1 with the addition of condition (7)(problem P.1b):

$$\max_{s_H^i, s_L^i, t_i, \beta_i, r_L^i} U_p(P_i^R, P_j^R) = B_i^\gamma \quad \text{s.t.}$$

$$B_i = \beta_i s_L^i I$$

$$(s_H^i + s_L^i) I \leq \lambda I$$

$$\beta_i + r_L^i \leq \alpha_L$$

$$r_L^i s_L^i I + s_H^i I + t_i s_H^i I \geq \lambda I$$

$$\frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} \geq \frac{\epsilon}{2}$$

$$-M \leq \frac{(s_L^i - s_L^j)b}{1 - q} \leq M$$

$$-M \leq \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{q} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{q} \leq M$$

$$0 \leq t_i \leq \alpha_H - 1$$

The solution to this problem is provided below⁵:

$$\tilde{\beta} = \alpha_L, \quad \tilde{r}_L = 0, \quad \tilde{t}_i = \frac{\alpha_H \lambda I}{\lambda I + M \epsilon + s_H^j(\alpha_H - 1 - t_j)I} - 1,$$

⁵The derivation of the solution is provided in Appendix A.

$$\widetilde{s}_L^i = \frac{\lambda(\alpha_H - 1)I - (M\epsilon + s_H^j(\alpha_H - 1 - t_j)I)}{\alpha_H I} \quad \widetilde{s}_H^i = \frac{\lambda I + M\epsilon + s_H^j(\alpha_H - 1 - t_j)I}{\alpha_H I}$$

The above variables comprise the elements of the politician's proposal which, given his opponent's proposal, maximize his utility under the condition that he wins the election with certainty. We denote this proposal as \widetilde{P}_i^R . The associated utility level from this proposal is expressed as:

$$\widetilde{U}_p = \widetilde{B}_i^\gamma = \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} (M\epsilon + s_H^j(\alpha_H - 1 - t_j)I) \right]^\gamma$$

The above expression is very intuitive. The first term is the utility the politician would get if he were a dictator. The second term reflects the utility loss the politician must suffer in order to win the election and it is decreasing in s_H^j . The more funds P_j provides to good projects, and hence the less corrupt he is, the greater are the concessions P_i has to make to secure victory.

This is not his best response function however. The politician might do better by mimicking his opponent's proposal and not suffering the cost of higher concessions to voters. In order to verify if this is the case, the politician needs also to solve P.1 under the slightly modified condition:

$$V^i(P_i^R, P_j^R) = \frac{1}{2} \Leftrightarrow \frac{1}{2} + \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} = \frac{1}{2}$$

Of course, the above condition implies that: $s_H^i = s_H^j, s_L^i = s_L^j, t_i = t_j$ which means that P_i mimics P_j 's proposal. In that case P_i 's utility would be:

$$U_p = \frac{1}{2} B_i^\gamma = \frac{1}{2} (\beta_i s_L^j I)^\gamma = \frac{1}{2} (\alpha_L s_L^j I)^\gamma \quad ^6$$

Therefore, P_i prefers to win the election with probability $\frac{1}{2}$ to a certain victory if and only if:

$$U_p \geq \widetilde{U}_p \Leftrightarrow \frac{1}{2} (\alpha_L s_L^j I)^\gamma \geq \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} (M\epsilon + s_H^j(\alpha_H - 1 - t_j)I) \right]^\gamma$$

⁶It is very easy to verify that if P_i mimics his opponent then his best response is to set $\beta_i = \alpha_L$, by following exactly the same method as we did in the Appendix A for the case of pure election victory.

$$\Leftrightarrow s_L^j \leq \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I} \quad 7$$

The above condition sets a critical level for the strategies P_i will play. If his opponent chooses s_L^j above this value, then P_i prefers to compete aggressively and win the election, while if it is below this value then he prefers to make exactly the same proposal as the other politician and at least get $\frac{1}{2}$ chance of gaining power. But he would never opt for high values of corruption and lose all chances of being elected, since, by the assumptions of the model, the only way he can gain some utility is through the potential bribes that come along with power.

Because of the symmetry of the political game, of course, P_j faces a similar condition and the same strategic issues:

$$s_L^i \leq \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I}$$

Hence, the unique equilibrium of the game is:

$$s_L^i = s_L^j = \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I}$$

The two politicians mimic each other's proposals and chance determines who gets the power. If one of them deviates from this equilibrium and increases taxation by even an infinitesimal amount, the other one can do better by decreasing it and winning election for sure. On other hand, none of them has an incentive to decrease the level of funds that goes to low quality projects as winning the election with certainty, in this case, lowers the politician's utility when compared with the utility level he derives by mimicking his opponent's proposal. Therefore the symmetric equilibrium of this political game can be fully described as:

$$\begin{aligned} \beta_i = \beta_j = \alpha_L, \quad r_L^i = r_L^j = 0, \quad s_L^i = s_L^j = \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I}, \\ s_H^i = s_H^j = \lambda - \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I}, \quad t_i = t_j = \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H \lambda I - 2^{\frac{1}{\gamma}} M \epsilon} \end{aligned}$$

The equilibrium utility level politicians receive is:

$$U_p^* = \frac{1}{2} \left[\frac{2^{\frac{1}{\gamma}}}{2^{\frac{1}{\gamma}} - 1} \frac{\alpha_L}{\alpha_H} M \epsilon \right]^\gamma$$

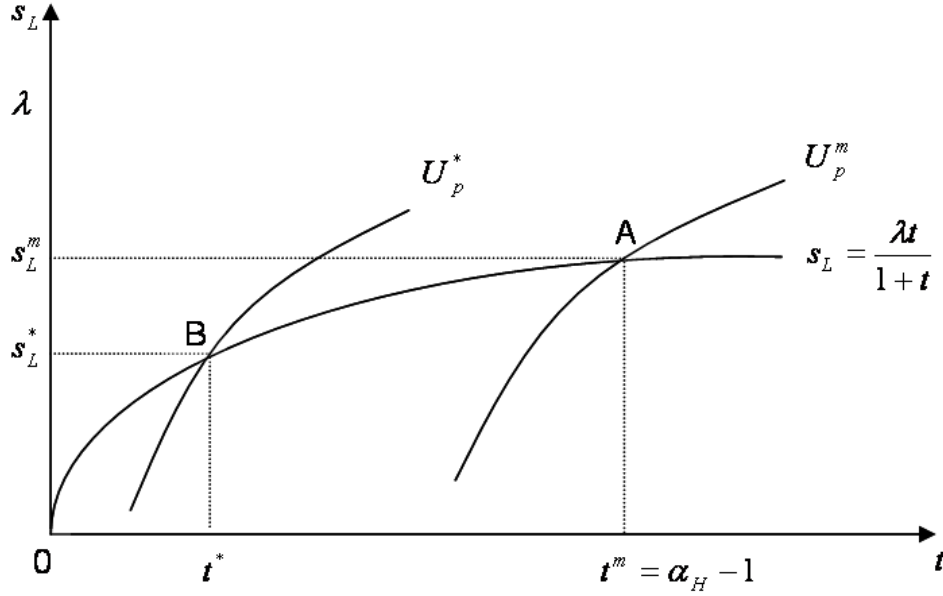


Figure 3: Political Equilibria under Monopoly and Competition

The equilibrium is also represented diagrammatically in the figure 3. It is drawn in the $\{t, s_L\}$ space and utility increases for the politician as t and s_L increase. The $s_L = \frac{\lambda t}{1+t}$ curve corresponds to the level of low quality projects that can be undertaken as a function of the tax rate when the condition $\beta = \alpha_L$ holds. It represents the profitability of banks condition (6) and shows the maximum number of low quality projects that can be financed for each level of taxation so that public banks do not go bankrupt.

Point A stands for the autocratic case, when the politician faces no challenges to his power and hence he can set the maximum possible tax in order to fund as many low quality projects as possible and reap the maximum level of bribes⁸. On the other hand, point B in the diagram shows the case of political competition. Due to the fear of losing the election, politicians must provide some concessions to voters in terms of lower corruption.

However, the level of corruption that will prevail in the economy depends on the degree of ideological adherence and the necessary majority to consolidate power. So long as M and ϵ are sufficiently small, the cost of undermining a political opponent remains less than the benefit of winning the election and political competition has a bite on lowering the expropriating power of politicians. Specifically, a necessary condition for lower corruption under political competition than the autocratic case is:

⁷The derivation of this inequality is included in Appendix A.

⁸See Appendix C for a detailed analysis of this case.

$$s_L^* \leq s_L^m \Leftrightarrow \frac{2^{\frac{1}{\gamma}} M \epsilon}{\left(2^{\frac{1}{\gamma}} - 1\right) \alpha_H I} \leq \frac{\lambda(\alpha_H - 1)}{\alpha_H} \Leftrightarrow M \epsilon \leq \frac{\left(2^{\frac{1}{\gamma}} - 1\right) \lambda(\alpha_H - 1) I}{2^{\frac{1}{\gamma}}} \quad (8)$$

The left hand side of (8) represents the cost the politician must suffer in order to win the election, while the right side is the perceived benefit: the total profits that would be generated in the economy if all good projects were undertaken weighted by the increase in probability of winning the election and the degree of risk aversion of the politician⁹.

In other words, the greater the degree of ideological adherence of voters to their preferred politician the more difficult it is for his opponent to attract away the necessary mass of supporters, and hence the greater the de facto power of the politician to set his policy closer to his most preferred choice. For the same reason, the higher the necessary mass of voters for an election victory the more inefficient political proposals become.

If $\epsilon = 0$ or $M = 0$, then attracting voters is unnecessary or costless for political victory so that there is perfect political competition, which implies that only good projects receive funds and politicians obtain no bribes. On the other hand, if condition (8) is violated, then essentially the cost of political competition is so high that politicians can act as monopolists (dictators). In other words, economies with higher degree of polarization or greater political instability, which require increased majorities for the implementation of power, give greater power to politicians to act according to their best interest and face the risk of higher corruption.

Finally, the degree of risk aversion of the politician works against rent seeking policies. The more risk averse the politicians are the more they seek to secure victory in elections and hence the tougher the political competition. As a result, the number of bad projects funded and the implied level of corruption decrease on their political proposals.

3 Political Competition and Financial Openness

Up to this point our model was concerned with a closed economy with limited funds, so that not all projects could be undertaken. In this section we allow the politicians to incorporate on their campaign proposals a degree of financial openness, so that they can relax the financial constraint of the economy.

The degree of financial openness is captured by the variable μ , which denotes the mass of domestic firms that receive funding from external investors. These inflows can be interpreted as either funds provided by foreign private banks or foreign direct investment. What matters for the economic analysis is that the foreign financial institutions

⁹Notice that if $\gamma = 1$, then $\frac{\left(2^{\frac{1}{\gamma}} - 1\right)}{2^{\frac{1}{\gamma}}} = \frac{1}{2}$.

face perfect competition and allocate capital solely on economically based criteria, so that only good projects receive funds and they repay back the initial capital I to foreign investors ¹⁰.

Opening up the economy is beneficial for the politicians as well, since it relaxes the internal funding constraint they face. As more efficient type projects can now be undertaken, politicians can receive higher tax revenues, which they can channel through public banks to bad projects and themselves. The financial openness version of the politicians' problem is (P.2):

$$\begin{aligned}
& \max_{s_H^i, s_L^i, t_i, \beta_i, r_L^i, \mu_i} U_p(P_i^R, P_j^R) = p_{win}^i B_i^\gamma \quad \text{s.t.} \\
& B_i = \beta_i s_L^i I \\
& (s_H^i + s_L^i) I \leq \lambda I \\
& s_H^i + \mu_i \leq q \\
& \beta_i + r_L^i \leq \alpha_L \\
& r_L^i s_L^i I + s_H^i I + t_i(s_H^i + \mu_i) I \geq \lambda I \\
& 0 \leq t_i \leq \alpha_H - 1 \\
& p_{win}^i = 1, \text{ if } V^i - V^j \geq \epsilon, p_{win}^i = \frac{1}{2}, \text{ if } -\epsilon \leq V^i - V^j \leq \epsilon, p_{win}^i = 0, \text{ if } V^i - V^j \leq -\epsilon
\end{aligned}$$

This problem is almost identical to the one in section 1. The only difference is the addition of one extra condition which captures the fact that the total funds provided for good projects can not exceed the funds required by them. This condition, however, will hold with equality in equilibrium, as it is always a best response for a politician to allow for all good projects in the economy to be undertaken, no matter what strategy the other candidate follows. In all other aspects the structure of the model is identical. Politicians will either go for an aggressive strategy or choose to mimic their opponent in order to draw the election, depending on their payoff and the strategy of the other

¹⁰In our model, financial openness implies capital inflows but not capital outflows. Capital markets are assumed to be competitive and so outside investors are making zero profits in equilibrium. As a result, the imposition of taxes has no effect on outside investors and does not give rise to capital flights. However, taxes do affect entrepreneurs and so entrepreneurs have an incentive to move to countries with lower tax rates, provided that the relocation costs are zero. Here, we assume that these relocation costs are sufficiently high so that moving to another country is not a profitable choice. This is particularly relevant for firms whose production is intensive in immobile factors of production. The formalization of this argument is available from the authors upon request.

politician. The total number of votes a politician receives in this case is given by:

$$V^i(P_i^R, P_j^R) = \frac{1}{2} + \frac{(s_H^i + \mu_i)[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{(s_H^j + \mu_j)[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M}$$

The difference with the equivalent condition of section 1 is that, under financial openness, the possibility for a high quality entrepreneur to receive funds is increased by the proposed extent of capital inflows relative to the total number of high quality projects. This is reflected in his voting behavior by making it more likely to vote for the politician who favors financial openness most. In fact, given the previous argument, the probability of the high-quality entrepreneur to receive funds is one for both political proposals.

The political game described above exhibits two possible equilibria, depending on the sign of a single condition.

Case 1: $b < (1 - \alpha_L)I$

This is the case when the political cost from gaining a vote from a low-quality entrepreneur is greater than the political benefit. Recall that b stands for the unverifiable private benefit that the entrepreneur receives when the project is undertaken. On the other hand the right hand side represents the cost to good firms and society due to the losses and the increase in taxation caused by the financing of a bad project.

When b is smaller than $(1 - \alpha_L)I$, the incremental social benefit, received by the low-quality entrepreneur, is lower than the incremental social cost of the loss of valuable resources, so that bad projects should not be undertaken at all. Politicians partially materialize this social preference through the cost on their political proposals. The compensation they need to provide to their voters with good projects is greater than their political benefit, so that politicians try to minimize the degree their policies appeal to low quality entrepreneurs.

Politicians will prefer to directly compete as long as ¹¹:

$$s_L \geq \frac{2^{\frac{1}{\gamma}}}{\left(2^{\frac{1}{\gamma}} - 1\right)} \frac{M\epsilon}{(I - b)} \quad (9)$$

Let $\Phi = \frac{2^{\frac{1}{\gamma}}}{\left(2^{\frac{1}{\gamma}} - 1\right)}$. The equilibrium of the game has the same interpretation as in section 1 and it is characterized by:

¹¹See Appendix B

$$s_L^i = s_L^j = \frac{\Phi M \epsilon}{(I - b)}, \quad \beta_i = \beta_j = \alpha_L, \quad r_L^i = r_L^j = 0, \quad s_H^i = s_H^j = \lambda - \frac{\Phi M \epsilon}{(I - b)}$$

$$\mu_i = \mu_j = q - \lambda + \frac{\Phi M \epsilon}{(I - b)}, \quad t_i = t_j = \frac{\Phi M \epsilon}{q(I - b)}$$

Case 2: $b > (1 - \alpha_L)I$

Under this condition, the political benefit of financing a low quality project is greater than its political cost. The result in terms of political competition is that politicians make proposals containing high levels of low quality funding in order to win the election. In other words, under the condition $b > (1 - \alpha_L)I$, the most cost efficient way of gaining political support is through a populist political platform, which promises very generous funding to entrepreneurs with bad projects. This is because low quality entrepreneurs are those who value the funding the most. The political competition condition is now expressed by ¹²:

$$s_L \leq \frac{q(\alpha_H - 1)}{(1 - \alpha_L)} - \frac{\Phi M \epsilon}{b} \quad (10)$$

The first term on the right hand side represents the gains generated by financing all good projects in the economy while the second term the concessions the politician needs to offer to low-quality entrepreneurs in order to win the election. As long as the number of bad projects proposed by the opponent of politician P_i is below this value, P_i can secure election victory and increase his utility by increasing taxation, subsidizing public banks and allowing for more bad projects to be undertaken. If, on the other hand, P_j makes a proposal above the threshold value of equation (10), P_i 's best response is to decrease the funding of bad projects by a little bit less than $\frac{M\epsilon}{b}$. This will allow him to increase the level of bribes he is receiving, without decreasing his chances of winning the election and therefore strictly improves his utility. Hence, the political equilibrium of the game in this case is attained when both politicians propose:

$$s_L^{j*} = s_L^{i*} = \frac{q(\alpha_H - 1)}{(1 - \alpha_L)} - \frac{\Phi M \epsilon}{b}$$

The equilibrium values for the rest of the variables are:

¹²See Appendix B

$$\beta^* = \frac{(1 - \alpha_L)^2 \Phi M \epsilon}{(\alpha_H - 1)qb - (1 - \alpha_L)\Phi M \epsilon}, r_L^* = \alpha_L - \beta^*, t^* = \alpha_H - 1, s_H^* = \lambda - s_L^*, \mu^* = q - \lambda + s_L^*$$

As we have already noted, because the incremental social value of an bad project exceeds its social cost, political competition is distorted toward low quality funding and greater corruption. This was not the case in section 1, where the limitation of available funds guaranteed that the marginal social value of an bad project was always less than the social cost, because a high quality entrepreneur lost the opportunity to fund its project. In other words, financial openness allows all high quality entrepreneurs to receive the private benefit of running the project so that the only social cost of a low quality project is the destruction of resources through its operation. This means that financial openness may increase or decrease the relative corruption levels in an economy, depending on the level of private benefits that accrue to low quality entrepreneurs and the bargaining power of politicians.

Finally, it is important to note that the distinction between the two different equilibria of the game may give an indication why some societies face greater corruption problems than others. Notice that the condition, which creates the distinction between cases 1 and 2 and which determines the pervasiveness of corruption in an economy, is more likely to hold (for case 2) when the ratio $\frac{b}{I}$ is higher. In other words, the higher the private benefits of running a project or the lower the required level of investment for that project, the more likely it is for an economy to be on the high corruption equilibrium. If the level of private unobservable benefits that accrue from a project are negatively related to the degree of development of its financial and investor protection systems and if the level of investment required increases along with the growth of the economy, then the model may be in position to explain why developed economies have lower levels of corruption.

Political Frictions and Financial Openness

In equilibrium, the degree of financial openness of the economy is defined as the aggregate capital inflows as a percentage of GDP and it is expressed as a function of political frictions, $M\epsilon$. The following equations provide the formulae for the two different regimes of the model:

$$\text{Case 1: } \frac{\mu^* I}{GDP} = \frac{q - \lambda + s_L}{(\alpha_h - 1)q + \lambda - (1 - \alpha_L)s_L} = \frac{(q - \lambda)(I - b) + \Phi M \epsilon}{[(\alpha_H - 1)q + \lambda](I - b) - (1 - \alpha_L)\Phi M \epsilon} \quad (11)$$

$$\text{Case 2: } \frac{\mu^* I}{GDP} = \frac{q - \lambda + s_L}{(\alpha_h - 1)q + \lambda - (1 - \alpha_L)s_L} = \frac{(\alpha_H - \alpha_L)qb - (1 - \alpha_L)(\lambda b + \Phi M\epsilon)}{(1 - \alpha_L)[(1 - \alpha_L)\Phi M\epsilon + \lambda b]} \quad (12)$$

These equations propose interesting implications for empirical testing. First of all, they imply that financial openness does not depend monotonically on political frictions. Whether political frictions have positive or negative effects to financial openness also depends on other parameters, like the private benefits of entrepreneurs, b , and the verifiable part of output of low quality projects, α_L .

If the private benefit of a low quality entrepreneur is lower than the loss of investment through his project, ($b < (1 - \alpha_L)I$), then financial openness is an increasing function of political frictions, while if the private benefit is greater than the loss of investment, financial openness is a decreasing function of political frictions. Recall that by the term political frictions we mean the degree of ideological adherence of voters and the super-majority requirement of election. In terms of proxies for empirical testing, political frictions can be viewed as the degree of polarization and the extra number of votes the first party needs over the second in order to form a government (super-majority requirement).

The model predicts that if a country has developed well-functioning institutions of investor protection and governance, so that the fraction of private benefits over investment is relatively low, then greater political polarization and stronger super-majority requirement will positively affect financial openness. The opposite relationships will hold for countries with relatively weak government institutions. Therefore, the model generates some predictions which have not been tested empirically yet.

Government Size and Financial Openness

Our model provides has also empirical implications for the relationship between financial openness and government size. Relative openness was defined in the previous section as $\frac{\mu I}{GDP}$. Government size is defined as: $\frac{qt}{GDP}$, where the numerator represents the aggregate taxation in the economy and the denominator is the summation of the present value of all projects funded in the economy minus external funding ($GDP = \alpha_L s_L I + \alpha_H s_H I - \mu I$).

The degree of openness and relative government size are positively correlated in our model, because both of them are either positively or negatively correlated with political frictions. More specifically, when equation (11) holds, an increase in political frictions $M\epsilon$ increases the fraction of high quality projects financed by external investors, as politicians finance a greater number of low quality projects. Hence relative financial openness also goes up. At the same time, aggregate taxation goes up, while the GDP of the economy goes down, as more low quality projects being financed implies lower creation of domestic resources. Therefore, an increase in $M\epsilon$ is positively correlated

with openness and government size.

On the other hand, when equation (12) holds, openness is negatively correlated with political frictions. Also an increase in political frictions will decrease the relative size of the government, because aggregate taxation will remain constant (see equilibrium value t^* under (12)), but the number of low quality projects that receive funds will decrease and hence the GDP will increase. Therefore openness and government size are positively correlated, as both will decrease if political frictions increase. Intuitively, political rents are positively correlated with the size of the government and so politicians have an incentive to increase the degree of openness of an economy, because this offers them greater opportunities for appropriation of resources through bribes or corruption. To the best of our knowledge, this prediction has not been tested empirically ¹³.

Relative Corruption and Financial Openness

The results of this section also allow us to check the conditions under which financial openness facilitates the reduction of relative corruption in the economy. By relative corruption we mean the total corruption bribe politicians receive divided by the Gross Domestic Product (GDP) of the economy. It is the share of observed output, which politicians receive as rents. Let RC^c denote the degree of relative corruption in a financially closed economy. By using the equilibrium levels of the control variables of the closed economy model, relative corruption can be expressed in terms of the main parameters:

$$RC^c = \frac{\beta s_L^c I}{GDP^c} = \frac{\beta s_L^c I}{\alpha_L s_L^c I + \alpha_H s_H^c I} \Leftrightarrow$$

$$RC^c = \frac{\alpha_L \Phi M \epsilon}{\alpha_L \Phi M \epsilon + \alpha_H (\alpha_H \lambda I - \Phi M \epsilon)} \text{ , where } \Phi = \frac{2^{\frac{1}{\gamma}}}{\left(2^{\frac{1}{\gamma}} - 1\right)}$$

If the economy is financially open, then we need to distinguish between the two different cases presented earlier:

$$\text{Case 1: If } b < (1 - \alpha_L)I \text{ then } RC^o = \frac{\alpha_L \Phi M \epsilon}{[(\alpha_H - 1)q + \lambda](I - b) - (1 - \alpha_L)\Phi M \epsilon}$$

$$\text{Case 2: If } b > (1 - \alpha_L)I \text{ then } RC^o = \frac{(1 - \alpha_L)\Phi M \epsilon}{(1 - \alpha_L)\Phi M \epsilon + b\lambda}$$

¹³The papers by Rodrik (1998) and Ram (2008) have found positive correlation between trade openness and government size, but they do not test directly for the relationship between financial openness and the government size.

Comparing the relative corruption measures between the open and closed model of the economy provides an indication of the factors that influence the effect of financial openness to corruption levels. Whether relative corruption will be higher in a closed economy than an open one ($RC^c > RC^o$), depends critically on the values of the model's parameters. We focus on two of them, which we consider of greater economic importance. The first is b , the private benefit of entrepreneurs, and the second is $M\epsilon$, the degree of political frictions, which affect politicians' bargaining power. In each of the cases described above, we rewrite the equation $RC^c = RC^o$ so that it expresses b as a function of $M\epsilon$, assuming that the rest of the parameters remain constant. This allows us to identify the range of values of the two variables for which relative corruption increases when the economy opens to foreign capital. This is shown in the following equations and in figure 4.

$$\text{Case 1 : } b = \frac{(\alpha_H - 1)qI - (1 - \alpha_H^2)\lambda I}{(\alpha_H - 1)q + \lambda} + \frac{(\alpha_H - 1)\Phi}{(\alpha_H - 1)q + \lambda} M\epsilon$$

$$\text{Case 2 : } b = \frac{(1 - \alpha_L)\alpha_H^2 I}{\alpha_L} - \frac{\alpha_H(1 - \alpha_L)\Phi}{\alpha_L \lambda} M\epsilon$$

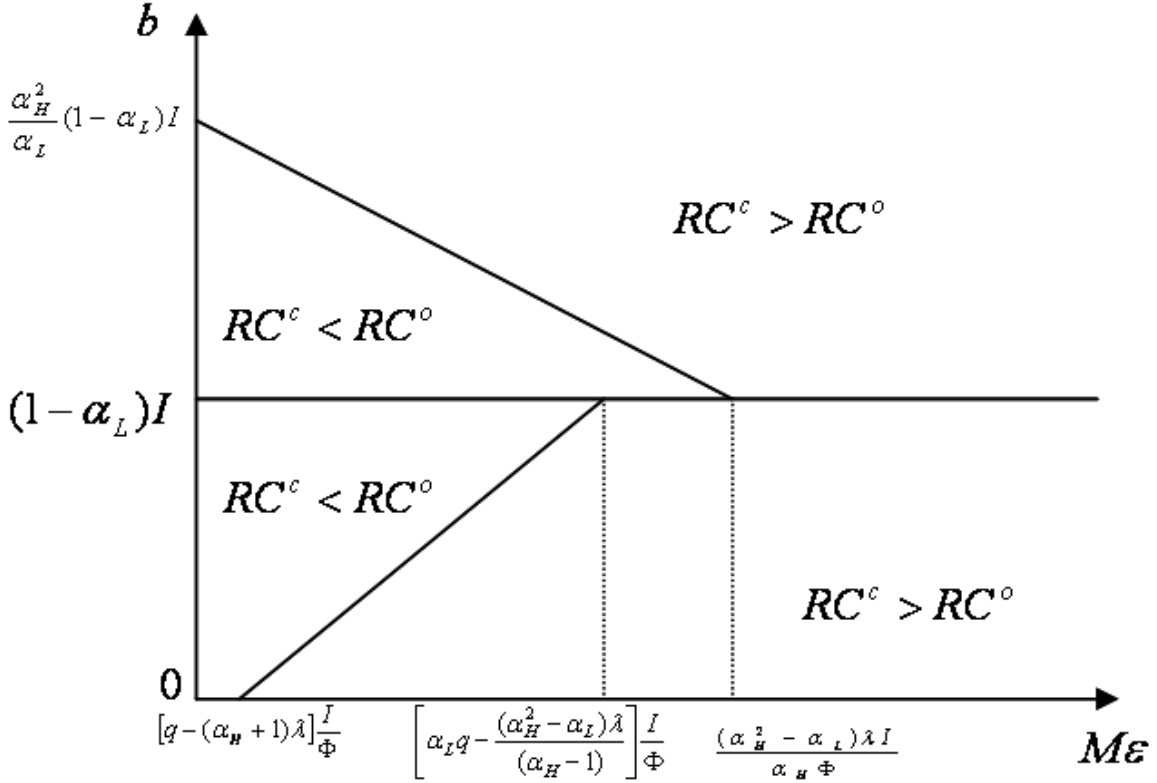


Figure 4: Relative Corruption and Financial Openness

In figure 4, the $b, \{M\epsilon\}$ space is separated into 4 areas. Open economies have higher ratios of political rents to GDP relative to closed economies in two of the four areas of the graph. Irrespectively of the level of private benefits that accrue to entrepreneurs, when the bargaining power of the politicians is weak (low levels of $M\epsilon$) open economies tend to favor relative corruption compared to closed economies. On the other hand, if political frictions are high (high levels of $M\epsilon$) then open economies exhibit less relative corruption than closed ones.

In other words, political frictions play a major role in closed economies in determining corruption levels. If political frictions are very low, then politicians have almost no ability to extract political rents so that when the economy opens the bargaining power of politicians improves and relative corruption increases. If political frictions are very high, however, politicians in a closed economy act completely unchecked and corruption is in extremely high levels. Financial openness, in this case, has the opposite effect. It decreases the bargaining power of politicians and reduces relative corruption. Nevertheless, it should be noted that in all the above cases absolute corruption increases so that politicians always prefer to open up the economy rather than not.

The main implication is that corruption in an economy may be correlated to financial openness either positively or negatively, depending also the level of political frictions, the private benefit of the entrepreneur and the loss of investment by bad projects. Generally, if political frictions are very low then corruption may be positively related to financial openness. For intermediary ranges of political frictions the relationship also depends on the functionality of political institutions. For relatively high levels of frictions, openness and corruption are negatively correlated. These findings may explain why empirical studies can not find a robust relationship between the two variables and point out to other key variables that empirical tests can incorporate.

4 Conclusion

In the preceding sections we presented a simple model of political competition. The model shows how ideological adherence of voters to specific candidates and super-majority requirements for election victory give enough bargaining power to politicians to receive positive political rents. Furthermore, if an economy faces financial restrictions, politicians have an incentive to liberalize capital accounts, so that they can increase income taxation and they receive more rents. Therefore, the model provides a political economy theory of financial openness.

It also has some interesting empirical implications. First, it predicts that the relationship between financial openness and corruption is not necessarily positive or negative, but it depends on other economic and political variables, like the electoral system or the degree investor protection. Hence, it can explain why recent economic studies fail to find a robust relationship between the two variables. Furthermore, our model is consistent with empirical studies, which report a negative effect of corruption levels

on growth (Mauro, 1995) and a positive effect of financial openness on entrepreneurial activity (Alfaro and Charlton, 2007).

The following two relationships have not been tested so far. First, the relationship between financial openness and government size, which, according to our model, is positive. Second, the relationship between frictions to political competition and openness. Our model suggests that if a country has well functioning institutions of investor protection, then financial openness is positively related to political frictions. If, on the other hand, a country has weak investor protection institutions, then openness and political frictions are negatively related. In addition, key political variables like electoral systems or political polarization may be required in studies which examine the impact of corruption to economic variables.

Appendix A

Solution to problem P.1b

Given that P_i wants to win the election with certainty, he solves the problem:

$$\max_{s_H^i, s_L^i, t_i, \beta_i, r_L^i} U_p(P_i^R, P_j^R) = B_i^\gamma \quad (13)$$

s.t.

$$B_i = \beta_i s_L^i I \quad (14)$$

$$(s_H^i + s_L^i) I \leq \lambda I \quad (15)$$

$$\beta_i + r_L^i \leq \alpha_L \quad (16)$$

$$r_L^i s_L^i I + s_H^i I + t_i s_H^i I \geq \lambda I \quad (17)$$

$$\frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} \geq \frac{\epsilon}{2} \quad (18)$$

$$-M \leq \frac{(s_L^i - s_L^j)b}{1 - q} \leq M \quad (19)$$

$$-M \leq \frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{q} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{q} \leq M \quad (20)$$

$$0 \leq t_i \leq \alpha_H - 1 \quad (21)$$

Constraints (15), (16), (17) and (18) of this maximization problem will hold with equality at the solution. Otherwise the politician can do better by changing one of the variables of the problem and receiving strictly higher utility. First, condition (18) can be written:

$$\frac{s_H^i[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{s_H^j[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} = \frac{\epsilon}{2} \Leftrightarrow$$

$$s_H^i[(\alpha_H - 1 - t_i)I + b] - s_H^j[(\alpha_H - 1 - t_j)I + b] + (s_L^i - s_L^j)b = M\epsilon \Leftrightarrow$$

$$s_H^i(\alpha_H - 1 - t_i)I + s_H^i b + s_L^i b = M\epsilon + s_H^j(\alpha_H - 1 - t_j)I + s_H^j b + s_L^j b$$

But now notice that, since $s_H^i b + s_L^i b = s_H^j b + s_L^j b = \lambda b$, the last equation is equivalent to:

$$s_H^i(\alpha_H - 1 - t_i)I = M\epsilon + s_H^j(\alpha_H - 1 - t_j)I \quad (22)$$

Now let $M(s_H^j, t_j) = M^* = M\epsilon + s_H^j(\alpha_H - 1 - t_j)I$. Since the politician can not directly affect his opponents' choice variables, they are considered as exogenous from his point of view, so that M^* is treated as a constant in his maximization problem. So:

$$s_H^i(\alpha_H - 1 - t_i)I = M^* \quad (23)$$

By (15) and (23):

$$\begin{aligned} (\lambda - s_L^i)(\alpha_H - 1 - t_i)I = M^* &\Leftrightarrow (\lambda - s_L^i)(\alpha_H - 1)I - (\lambda - s_L^i)t_i I = M^* \Leftrightarrow \\ t_i &= \alpha_H - 1 - \frac{M^*}{(\lambda - s_L^i)I} \end{aligned} \quad (24)$$

Also, by substituting (15) and (16) into (17) and solving for β_i we get the following expression:

$$\begin{aligned} (\alpha_L - \beta_i)s_L^i + (1 + t_i)(\lambda - s_L^i) &= \lambda \Leftrightarrow \alpha_L s_L^i - \beta_i s_L^i + \lambda + \lambda t_i - (1 + t_i)s_L^i = \lambda \Leftrightarrow \\ \lambda t_i + (\alpha_L - 1 - t_i)s_L^i &= \beta_i s_L^i \Leftrightarrow \beta_i = (\alpha_L - 1 - t_i) + \frac{\lambda t_i}{s_L^i} \end{aligned} \quad (25)$$

and by (24):

$$\begin{aligned} \beta_i &= \left(\alpha_L - 1 - \alpha_H + 1 + \frac{M^*}{(\lambda - s_L^i)I} \right) + \frac{\lambda \left(\alpha_H - 1 - \frac{M^*}{(\lambda - s_L^i)I} \right)}{s_L^i} \Leftrightarrow \\ \beta_i &= \frac{(\alpha_L - \alpha_H)(\lambda - s_L^i)I + M^*}{(\lambda - s_L^i)I} + \frac{\lambda \frac{(\alpha_H - 1)(\lambda - s_L^i)I - M^*}{(\lambda - s_L^i)I}}{s_L^i} \Leftrightarrow \\ \beta_i &= \frac{(\alpha_L - \alpha_H)(\lambda - s_L^i)I s_L^i + M^* s_L^i}{(\lambda - s_L^i)I s_L^i} + \frac{\lambda(\alpha_H - 1)(\lambda - s_L^i)I - \lambda M^*}{(\lambda - s_L^i)I s_L^i} \Leftrightarrow \\ \beta_i &= -(\alpha_H - \alpha_L) + \frac{\lambda(\alpha_H - 1)}{s_L^i} - \frac{M^*}{s_L^i I} \end{aligned} \quad (26)$$

Using equations (14) and (26) we substitute back to the objective function to rewrite it as a function of only one choice variable:

$$\begin{aligned}\max_{s_L^i} B_i^\gamma &= (\beta_i s_L^i I)^\gamma = \left[\left(-(\alpha_H - \alpha_L) + \frac{\lambda(\alpha_H - 1)}{s_L^i} - \frac{M^*}{s_L^i I} \right) s_L^i I \right]^\gamma \\ &= [-(\alpha_H - \alpha_L)s_L^i I + (\alpha_H - 1)\lambda I - M^*]^\gamma\end{aligned}$$

Since the objective function is monotonic in γ , the maximum of the above expression is attained at the same level of s_L^i as the maximum of B_i . The F.O.C. for this simpler problem is:

$$\frac{\partial B_i}{\partial s_L^i} = -(\alpha_H - \alpha_L)I < 0, \text{ since } \alpha_H > \alpha_L, I > 0$$

This implies that the politician must reduce s_L^i as much as possible in order to maximize his own utility, and this holds irrespectively of the political proposal of the opponent. Notice that, by equation (26), as s_L^i decreases β_i increases (and also notice that because $t_i \geq 0$, it must hold that $\lambda(\alpha_H - 1)I - M^* > 0$, by equation (24)). Therefore, the minimum possible level for s_L^i is the one that makes β_i the maximum possible. This implies that at the optimum $\beta_i = \alpha_L$. By using equation (26) once more we get the solution for s_L^i :

$$\begin{aligned}\alpha_L &= -(\alpha_H - \alpha_L) + \frac{\lambda(\alpha_H - 1)}{s_L^i} - \frac{M^*}{s_L^i I} \Leftrightarrow 0 = -\alpha_H + \frac{\lambda(\alpha_H - 1)I - M^*}{s_L^i I} \Leftrightarrow \\ s_L^i &= \frac{\lambda(\alpha_H - 1)I - M^*}{\alpha_H I}\end{aligned}\tag{27}$$

And, by (24):

$$\begin{aligned}t_i &= \alpha_H - 1 - \frac{M^*}{(\lambda - s_L^i)I} \Leftrightarrow t_i = \alpha_H - 1 - \frac{M^*}{\left(\lambda - \frac{\lambda(\alpha_H - 1)I - M^*}{\alpha_H I} \right) I} \Leftrightarrow \\ t_i &= \alpha_H - 1 - \frac{M^*}{\left(\frac{\lambda\alpha_H I - \lambda\alpha_H I + \lambda I + M^*}{\alpha_H I} \right) I} \Leftrightarrow t_i = \alpha_H - 1 - \frac{\alpha_H M^*}{\lambda I + M^*} \Leftrightarrow \\ t_i &= \frac{\alpha_H \lambda I}{\lambda I + M^*} - 1\end{aligned}\tag{28}$$

In order to complete the solution, note that $\beta_i = \alpha_L \Rightarrow r_L = 0$ and that:

$$s_H^i = \lambda - s_L^i \Rightarrow s_H^i = \lambda - \frac{\lambda(\alpha_H - 1)I - M^*}{\alpha_H I} \Leftrightarrow s_H^i = \frac{\lambda I + M^*}{\alpha_H I}$$

The utility the politician will derive by winning the elections as a response to his opponent's proposal is:

$$\widetilde{B}_i^\gamma = (\beta_i s_L^i I)^\gamma = \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} M^* \right]^\gamma \Rightarrow$$

$$\widetilde{B}_i^\gamma = \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} (M\epsilon + s_H^j(\alpha_H - 1 - t_j)I) \right]^\gamma$$

If the politician decides to mimic he gets utility (see also the political equilibrium section of the paper):

$$U_p = \frac{1}{2} B_i^\gamma = \frac{1}{2} (\beta_i s_L^i I)^\gamma = \frac{1}{2} (\alpha_L s_L^j I)^\gamma$$

Politician decides not to pursue victory iff:

$$U_p \geq \widetilde{U}_p \Leftrightarrow \frac{1}{2} (\alpha_L s_L^j I)^\gamma \geq \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} (M\epsilon + s_H^j(\alpha_H - 1 - t_j)I) \right]^\gamma \Leftrightarrow$$

$$\alpha_L s_L^j I \geq 2^{\frac{1}{\gamma}} \left[\frac{\alpha_L(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{\alpha_L}{\alpha_H} (M\epsilon + (\lambda - s_L^j)(\alpha_H - 1 - t_j)I) \right]$$

At this point notice that, since the problem is symmetric, P_j will also set $\beta_j = \alpha_L$ in order to maximize his utility irrespectively of what P_i will do and by equation (25) we have:

$$\alpha_L = (\alpha_L - 1 - t_j) + \frac{\lambda t_j}{s_L^j} \Leftrightarrow 1 + t_j = \frac{\lambda t_j}{s_L^j} \Leftrightarrow s_L^j = \lambda t_j - s_L^j t_j \Leftrightarrow t_j = \frac{s_L^j}{\lambda - s_L^j} \quad (29)$$

We use this into the preceding expression:

$$s_L^j I \geq 2^{\frac{1}{\gamma}} \left[\frac{(\alpha_H - 1)\lambda I}{\alpha_H} - \frac{1}{\alpha_H} \left(M\epsilon + (\lambda - s_L^j) \left(\alpha_H - 1 - \frac{s_L^j}{\lambda - s_L^j} \right) I \right) \right] \Leftrightarrow$$

$$s_L^j \geq 2^{\frac{1}{\gamma}} \frac{\lambda(\alpha_H - 1)}{\alpha_H} - 2^{\frac{1}{\gamma}} \frac{M\epsilon}{\alpha_H I} - 2^{\frac{1}{\gamma}} \frac{\lambda(\alpha_H - 1)}{\alpha_H} + 2^{\frac{1}{\gamma}} \frac{(\alpha_H - 1)}{\alpha_H} s_L^j + 2^{\frac{1}{\gamma}} \frac{1}{\alpha_H} s_L^j \Leftrightarrow$$

$$s_L^j \geq -2^{\frac{1}{\gamma}} \frac{M\epsilon}{\alpha_H I} + 2^{\frac{1}{\gamma}} s_L^j \Leftrightarrow \left(1 - 2^{\frac{1}{\gamma}} \right) s_L^j \geq -2^{\frac{1}{\gamma}} \frac{M\epsilon}{\alpha_H I} \Leftrightarrow$$

$$s_L^j \leq \frac{2^{\frac{1}{\gamma}}}{\left(2^{\frac{1}{\gamma}} - 1 \right)} \frac{M\epsilon}{\alpha_H I} \quad (30)$$

Appendix B

Solution to problem P.2

The solution follows closely the steps of Appendix A.

Given that P_i wants to win the election with certainty, he solves the problem:

$$\max_{s_H^i, s_L^i, t_i, \beta_i, r_L^i, \mu_i} U_p(P_i^R, P_j^R) = B_i^\gamma \quad (31)$$

s.t.

$$B_i = \beta_i s_L^i I \quad (32)$$

$$(s_H^i + s_L^i) I \leq \lambda I \quad (33)$$

$$s_H^i + \mu_i \leq q \quad (34)$$

$$\beta_i + r_L^i \leq \alpha_L \quad (35)$$

$$r_L^i s_L^i I + s_H^i I + t_i (s_H^i + \mu_i) I \geq \lambda I \quad (36)$$

$$\frac{(s_H^i + \mu_i)[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{(s_H^j + \mu_j)[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} \geq \frac{\epsilon}{2} \quad (37)$$

$$-M \leq \frac{(s_L^i - s_L^j)b}{1 - q} \leq M \quad (38)$$

$$-M \leq \frac{(s_H^i + \mu_i)[(\alpha_H - 1 - t_i)I + b]}{q} - \frac{(s_H^j + \mu_j)[(\alpha_H - 1 - t_j)I + b]}{q} \leq M \quad (39)$$

$$0 \leq t_i \leq \alpha_H - 1 \quad (40)$$

Given that restrictions (33)-(37) will be satisfied in equilibrium with equality, restriction (37) rewrites:

$$\frac{(s_H^i + \mu_i)[(\alpha_H - 1 - t_i)I + b]}{2M} - \frac{(s_H^j + \mu_j)[(\alpha_H - 1 - t_j)I + b]}{2M} + \frac{(s_L^i - s_L^j)b}{2M} = \frac{\epsilon}{2} \Leftrightarrow$$

$$q[(\alpha_H - 1 - t_i)I + b] - q[(\alpha_H - 1 - t_j)I + b] + (s_L^i - s_L^j)b = M\epsilon \Leftrightarrow$$

$$-qt_i I + qt_j I + s_L^i b - s_L^j b = M\epsilon \Leftrightarrow$$

$$-qt_i I + s_L^i b = M\epsilon - qt_j I + s_L^j b \Leftrightarrow$$

$$-qt_i I + s_L^i b = M^* \quad (41)$$

$$where : M^* = M\epsilon - qt_j I + s_L^j b \quad (42)$$

Solving for t_i :

$$t_i = \frac{s_L^i b - M^*}{qI} \quad (43)$$

Also, by constraints (33)-(36), we have:

$$\alpha_L s_L^i - \beta_i s_L^i + qt_i + \lambda - s_L^i = \lambda \Leftrightarrow \beta_i s_L^i = (\alpha_L - 1)s_L^i + qt_i \Leftrightarrow$$

$$\beta_i = (\alpha_L - 1) + \frac{qt_i}{s_L^i} \quad (44)$$

Substituting back (43) into (44):

$$\beta_i = (\alpha_L - 1) + \frac{q \frac{s_L^i b - M^*}{qI}}{s_L^i} \Leftrightarrow \beta_i = (\alpha_L - 1) + \frac{b}{I} - \frac{M^*}{s_L^i I} \quad (45)$$

Hence:

$$B_i = \beta_i s_L^i I \Leftrightarrow B_i = \left[(\alpha_L - 1) + \frac{b}{I} - \frac{M^*}{s_L^i I} \right] s_L^i I \Leftrightarrow B_i = (\alpha_L - 1) s_L^i I + b s_L^i - M^*$$

$$\frac{\partial B_i}{\partial s_L^i} = (\alpha_L - 1)I + b \quad {}^{14}$$

Case 1: $\frac{\partial B_i}{\partial s_L^i} < 0 \Leftrightarrow b < (1 - \alpha_L)I$

The politician maximizes his utility by setting s_L^i to its minimum possible value. Since β_i is a negative function of s_L^i , by (44), the minimum value of the latter variable is attained when β_i reaches its maximum value, hence $\beta_i = \alpha_L$. By (45), this implies that:

$$\frac{M^*}{s_L^i I} = -1 + \frac{b}{I} \Leftrightarrow \frac{M^*}{s_L^i} = b - I \Leftrightarrow s_L^i = \frac{M^*}{b - I} \quad (46)$$

And by (43), it implies that:

$$s_L^i = q t_i \quad (47)$$

Also, the condition is symmetric for both politicians and irrespective of their strategy so that $s_L^j = q t_j$ also holds. The utility of politician by winning the election is:

$$\begin{aligned} \widetilde{B}_i^\gamma &= \left(\widetilde{\beta}_i \widetilde{s}_L^i I \right)^\gamma = \left(\alpha_L \frac{M^*}{b - I} I \right)^\gamma = \left(\alpha_L \frac{M\epsilon - q t_j I + s_L^j b}{b - I} I \right)^\gamma \Leftrightarrow \\ \widetilde{B}_i^\gamma &= \left(\alpha_L \frac{M\epsilon - s_L^j I + s_L^j b}{b - I} I \right)^\gamma \Leftrightarrow \widetilde{B}_i^\gamma = \left(\alpha_L \frac{M\epsilon + s_L^j (b - I)}{b - I} I \right)^\gamma \end{aligned} \quad (48)$$

If he were to mimic his opponent, instead, he would get utility equal to:

$$\frac{1}{2} B_i^\gamma = (\beta_i s_L^i I)^\gamma = (\alpha_L s_L^j I)^\gamma \quad (49)$$

¹⁴Recall, that because U_p is monotonic in γ , finding the values of the control variables that maximize it is equivalent to finding the values of the control variables that maximize B_i .

The politician prefers to mimic his opponent iff:

$$U_p \geq \widetilde{U}_p \Leftrightarrow \frac{1}{2}B_i^\gamma \geq \widetilde{B}_i^\gamma \Leftrightarrow B_i \geq 2^{\frac{1}{\gamma}}\widetilde{B}_i \Leftrightarrow \alpha_L s_L^j I \geq 2^{\frac{1}{\gamma}}\alpha_L \frac{M\epsilon + s_L^j(b-I)}{b-I}I \Leftrightarrow$$

$$-2^{\frac{1}{\gamma}}s_L^j + s_L^j \geq 2^{\frac{1}{\gamma}}\frac{M\epsilon}{b-I} \Leftrightarrow s_L^j \leq \frac{2^{\frac{1}{\gamma}}}{(2^{\frac{1}{\gamma}}-1)}\frac{M\epsilon}{(I-b)}$$

From the above inequality, we infer that the critical values for the politicians' strategies are:

$$s_L^{j*} = s_L^{i*} = \frac{2^{\frac{1}{\gamma}}}{(2^{\frac{1}{\gamma}}-1)}\frac{M\epsilon}{(I-b)} \quad (50)$$

The equilibrium of the game is described in section 2.

Case 2: $\frac{\partial B_i}{\partial s_L^i} > 0 \Leftrightarrow b > (1 - \alpha_L)I$

This is the opposite case. Politicians try to win the election by luring low quality entrepreneurs to support them. In order to maximize their chances of winning, they need to set the value of s_L as high as possible. Since this is positively related to the value of taxes in the economy (see also equation 43), s_L^i reaches its maximum value when $t_i = \alpha_H - 1$. In fact, because the condition characterizing this case is the same for both politicians, they will both set $t = \alpha_H - 1$, irrespectively of what their opponent does. Therefore, equation (41) can be rewritten as:

$$s_L^i b = M\epsilon + s_L^j b \Leftrightarrow \widetilde{s}_L^i = s_L^j + \frac{M\epsilon}{b} \quad (51)$$

The above equation expresses the number of low quality entrepreneurs needed by politician P_i in order to secure election victory as a function of the proposal of his opponent. Also notice that equation (44) becomes in this case:

$$\widetilde{\beta}_i = -(1 - \alpha_L) + \frac{q(\alpha_H - 1)}{\widetilde{s}_L^i} \quad (52)$$

Given the above, the utility for the politician by winning the election is:

$$\widetilde{B}_i^\gamma = \left(\widetilde{\beta}_i \widetilde{s}_L^i I \right)^\gamma = \left[\left(-(1 - \alpha_L) + \frac{q(\alpha - 1)}{\widetilde{s}_L^i} \right) \widetilde{s}_L^i I \right]^\gamma \Leftrightarrow$$

$$\widetilde{B}_i^\gamma = \left(-(1 - \alpha_L) \widetilde{s}_L^i I + (\alpha_H - 1) q I \right)^\gamma \Leftrightarrow$$

$$\widetilde{B}_i^\gamma = \left((\alpha_H - 1) q I - (1 - \alpha_L) (s_L^j + \frac{M\epsilon}{b}) I \right)^\gamma \Leftrightarrow$$

$$\widetilde{B}_i^\gamma = \left((\alpha_H - 1) q I - \frac{(1 - \alpha_L)}{b} M\epsilon I - (1 - \alpha_L) s_L^j \right)^\gamma \quad (53)$$

On the other hand, the utility for the politician by mimicking his opponent is:

$$\frac{1}{2} B_i^\gamma = \frac{1}{2} (\beta_i s_L^i I)^\gamma = \frac{1}{2} \left[\left(-(1 - \alpha_L) + \frac{q(\alpha_H - 1)}{s_L^j} \right) s_L^j I \right]^\gamma = \frac{1}{2} [q(\alpha_H - 1) I - (1 - \alpha_L) I s_L^j]^\gamma \quad (54)$$

The politician will choose to mimic iff:

$$U_p \geq \widetilde{U}_p \Leftrightarrow \frac{1}{2} B_i^\gamma \geq \widetilde{B}_i^\gamma \Leftrightarrow B_i \geq 2^{\frac{1}{\gamma}} \widetilde{B}_i \Leftrightarrow$$

$$(\alpha_H - 1) q I - (1 - \alpha_L) I s_L^j \geq 2^{\frac{1}{\gamma}} \left[(\alpha_H - 1) q I - \frac{(1 - \alpha_L) I}{b} M\epsilon - (1 - \alpha_L) I s_L^j \right] \Leftrightarrow$$

$$q(\alpha_H - 1) I - 2^{\frac{1}{\gamma}} q(\alpha_H - 1) I + 2^{\frac{1}{\gamma}} \frac{(1 - \alpha_L) I}{b} M\epsilon \geq -2^{\frac{1}{\gamma}} (1 - \alpha_L) - (1 - \alpha_L) I s_L^j \Leftrightarrow$$

$$s_L^j \geq \frac{q(\alpha_H - 1)}{(1 - \alpha_L)} - \frac{2^{\frac{1}{\gamma}}}{2^{\frac{1}{\gamma}} - 1} \frac{M\epsilon}{b} \quad (55)$$

Hence, the corresponding critical values for this case are:

$$s_L^{j*} = s_L^{i*} = \frac{q(\alpha_H - 1)}{(1 - \alpha_L)} - \frac{2^{\frac{1}{\gamma}}}{2^{\frac{1}{\gamma}} - 1} \frac{M\epsilon}{b} \quad (56)$$

Let $\Phi = \frac{2^{\frac{1}{\gamma}}}{2^{\frac{1}{\gamma}} - 1}$. Then, the equilibrium value for $\beta_i = \beta_j = \beta$ is given by:

$$\beta^* = -(1 - \alpha_L) + \frac{q(\alpha_H - 1)}{s_L^*} = \frac{-(1 - \alpha_L)s_L^* + q(\alpha_H - 1)}{s_L^*} \Leftrightarrow$$

$$\beta^* = \frac{(\alpha_L - 1) \left[\frac{q(\alpha_H - 1)}{1 - \alpha_L} - \frac{\Phi M\epsilon}{b} \right] + q(\alpha_H - 1)}{\frac{q(\alpha_H - 1)}{1 - \alpha_L} - \frac{\Phi M\epsilon}{b}} \Leftrightarrow$$

$$\beta^* = \frac{\frac{(1 - \alpha_L)\Phi M\epsilon}{b}}{\frac{(\alpha_H - 1)qb - (1 - \alpha_L)\Phi M\epsilon}{(1 - \alpha_L)b}} \Leftrightarrow$$

$$\beta^* = \frac{(1 - \alpha_L)^2 \Phi M\epsilon}{(\alpha_H - 1)qb - (1 - \alpha_L)\Phi M\epsilon} \quad (57)$$

Appendix C: Monopoly of Power Solution

As a benchmark case, it is interesting to study the autocratic case, where there is only one politician and whose power remains undisputed for all possible policies that do not violate the public banks' profitability condition.

If we were to assume that there is a dictator in the economy, whose power is unchallenged, then we implicitly impose that the politician does not face the fear of losing his position through elections and hence it would be equivalent to imposing the condition $p_{win} = 1$ to P.1 (see also page 10). In other words, under the assumption of autocracy, P.1 is transformed into (P.1a):

$$\max_{s_H, s_L, t, \beta, r_L} U_p = B^\gamma \quad \text{s.t.}$$

$$B = \beta s_L I$$

$$(s_H + s_L) I \leq \lambda I$$

$$\beta + r_L \leq \alpha_L$$

$$r_L s_L I + s_H I + t s_H I \geq \lambda I$$

$$0 \leq t \leq \alpha_H - 1$$

The above problem is easy to solve. First, notice that all inequalities will hold with equality in the final solution. If that was not the case, the politician would always increase his utility by increasing either the share of bad projects which receive funds or the level of the bribe until the restrictions are satisfied with equality¹⁵.

Keeping this in mind and by recursively substituting these conditions into the utility function we can rewrite the problem as an unconstrained one:

$$\max_{r_L, t} U_p = \left[(\alpha_L - r_L) \left(\frac{\lambda t}{1+t-r_L} \right) I \right]^\gamma \quad \text{s.t.}$$

$$\beta = \alpha_L - r_L$$

$$s_H = \lambda - s_L$$

$$s_L = \frac{\lambda t}{1+t-r_L}$$

$$0 \leq t \leq \alpha_H - 1$$

By taking first order conditions with respect to r_L and t , we get the following ex-

¹⁵A mathematical way to verify this is to set the Langrangian for the maximization problem and then show that all Langrange multipliers are strictly positive so that the constraints are binding.

pressions ¹⁶:

$$\frac{\partial U}{\partial r_L} = \frac{-\lambda t I}{1+t-r_L} - \frac{(\alpha_L - r_L)(-\lambda t I)}{(1+t-r_L)^2} = \frac{-\lambda t I(1+t-r_L) + (\alpha_L - r_L)\lambda t I}{(1+t-r_L)^2} = \frac{\lambda t I(\alpha_L - 1 - t)}{(1+t-r_L)^2} < 0$$

and

$$\frac{\partial U}{\partial t} = (\alpha_L - r_L) I \frac{\lambda(1+t-r_L) - \lambda t}{(1+t-r_L)^2} = (\alpha_L - r_L) I \frac{\lambda(1-r_L)}{(1+t-r_L)^2} \geq 0$$

The above conditions imply that in order the politician to maximize his utility he must set the bad projects' repayment as low as possible and the tax rate as high as possible. The full set of the monopoly of power solution is:

$$r_L = 0, \beta = \alpha_L, t = \alpha_H - 1, s_L = \frac{\lambda(\alpha_H - 1)}{\alpha_H}, s_H = \frac{\lambda}{\alpha_H}$$

$$\text{and } U_p^m = \left[\frac{\lambda \alpha_L (\alpha_H - 1) I}{\alpha_H} \right]^\gamma$$

As should be expected, the dictator, since he does not face any real threat to his power, sets taxation for good projects to its maximum possible level, expropriating all their profits, imposes no repayment to low-quality entrepreneurs, in order to receive maximum possible bribes, and balances the proportion of high and low quality projects financed so as to maximize his wellbeing. This is a straightforward result that shows the degree of corruption that is generated by autocratic regimes in the particular set up of our model.

¹⁶Because U_p^m is a monotonic transformation of U_p , both of them have their maximum for the same values of r_L and t . For simplification reasons, we derive the first order conditions of the former expression

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